

WHAT IS CLAIMED IS:

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1. A software analysis apparatus comprising:
program analysis information generation means for automatically generating program analysis information required for analyzing a computer program;

program analysis information storage means for sequentially storing the program analysis information generated by said program analysis information generation means in a predetermined data recording medium in an arbitrary unit or at an arbitrary timing;
and

program analysis means for executing program analysis by reading out the program analysis information from said data recording medium.

2. An apparatus according to claim 1, wherein said program analysis means reads out the program analysis information from said data recording medium, and executes program analysis by an interactive process with an operator.

3. An apparatus according to claim 1, wherein said program analysis means reads out the program analysis information from said data recording medium, and executes program analysis by a batch process.

4. An apparatus according to claim 3, wherein said program analysis means generates at least one of metrics information, redundancy information, data flow anomaly information, and maintenance document information by the batch process.

5. An apparatus according to claim 1, wherein said program analysis information generation means generates a plurality of kinds of program analysis information in turn, and said program analysis information storage means stores the program analysis information in said data recording medium every time each kind of program analysis information is generated.

6. An apparatus according to claim 5, further comprising range instruction means for instructing a range of the plurality of kinds of program analysis information to be generated.

7. An apparatus according to claim 1, wherein said program analysis information storage means stores the program analysis information in said data recording medium as a database.

8. An apparatus according to claim 1, wherein the program analysis information includes at least one of:

- a syntactic analysis tree generated on the basis of source code of the computer program;

- a symbol table indicating meanings of symbols used in source code of the computer program;

- a call graph or flow graph generated on the basis of the syntactic analysis tree;

- data flow information generated on the basis of the syntactic analysis tree, symbol table, flow graph, and call graph; and

- a program dependence graph or module I/O information generated on the basis of the syntactic

analysis tree, symbol table, flow graph, call graph, and data flow information.

9. An apparatus according to claim 8, wherein said program analysis information generation means generates the syntactic analysis tree and symbol table, call graph and flow graph, data flow information, and program dependence graph and module I/O information in the order listed.

10. An apparatus according to claim 9, wherein said program analysis information storage means stores each program analysis information in said data recording medium every time said program analysis information generation means generates one of the syntactic analysis tree and symbol table, call graph, flow graph, data flow information, program dependence graph, and module I/O information.

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A14 11. A software analysis apparatus for generating program analysis information required for analyzing a computer program, hierarchically registering the generated program analysis information in a database in units of analysis objectives, and implementing analysis by reading out the program analysis information already registered in a predetermined layer in correspondence with an analysis objective upon analyzing the computer program.

12. An apparatus according to claim 11, wherein the database is an object-oriented database.

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A15 13. A software analysis method comprising:

the program analysis information generation step of automatically generating program analysis information required for analyzing a computer program;

the program analysis information storage step of sequentially storing the program analysis information generated in the program analysis information generation step in a predetermined data recording medium in an arbitrary unit or at an arbitrary timing; and

the program analysis step of executing program analysis by reading out the program analysis information from said data recording medium.

14. A method according to claim 13, wherein the program analysis step includes the step of reading out the program analysis information from said data recording medium, and executing program analysis by an interactive process with an operator.

15. A method according to claim 13, wherein the program analysis step includes the step of reading out the program analysis information from said data recording medium, and executing program analysis by a batch process.

16. A method according to claim 15, wherein the program analysis step includes the step of generating at least one of metrics information, redundancy information, data flow anomaly information, and maintenance document information by the batch process.

17. A method according to claim 13, wherein the program analysis information generation step includes the step of generating a plurality of kinds of program analysis information in turn, and the program analysis information storage step includes the step of storing the program analysis information in said data recording medium every time each kind of program analysis information is generated.

18. A method according to claim 13, wherein the program analysis information storage step includes the step of storing the program analysis information in said data recording medium as a database.

19. A method according to claim 13, wherein the program analysis information includes at least one of:

- a syntactic analysis tree generated on the basis of source code of the computer program;

- a symbol table indicating meanings of symbols used in source code of the computer program;

- a call graph or flow graph generated on the basis of the syntactic analysis tree;

- data flow information generated on the basis of the syntactic analysis tree, symbol table, flow graph, and call graph; and

- a program dependence graph or module I/O information generated on the basis of the syntactic analysis tree, symbol table, flow graph, call graph, and data flow information.

20. A method according to claim 19, wherein the program analysis information generation step includes the step of generating the syntactic analysis tree and symbol table, call graph and flow graph, data flow information, and program dependence graph and module I/O information in the order listed.

21. A method according to claim 20, wherein the program analysis information storage step includes the step of storing each program analysis information in said data recording medium every time one of the syntactic analysis tree and symbol table, call graph, flow graph, data flow information, program dependence graph, and module I/O information is generated in the program analysis information generation step.

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ME 22. A software analysis method for generating program analysis information required for analyzing a computer program, hierarchically registering the generated program analysis information in a database in units of analysis objectives, and implementing analysis by reading out the program analysis information already registered in a predetermined layer in correspondence with an analysis objective upon analyzing the computer program.

23. A method according to claim 21, wherein the database is an object-oriented database.

24. A computer readable recording medium recording a program for making a computer implement:

a program analysis information generation function of automatically generating program analysis information required for analyzing a computer program;

a program analysis information storage function of sequentially storing the program analysis information generated by the program analysis information generation function in a predetermined data recording medium in an arbitrary unit or at an arbitrary timing; and

a program analysis function of executing program analysis by reading out the program analysis information from said data recording medium.

25. A medium according to claim 24, wherein the program analysis function reads out the program analysis information from said data recording medium, and executes program analysis by an interactive process with an operator.

26. A medium according to claim 25, wherein the program analysis function reads out the program analysis information from said data recording medium, and executes program analysis by a batch process.

27. A medium according to claim 26, wherein the program analysis function generates at least one of metrics information, redundancy information, data flow anomaly information, and maintenance document information by the batch process.

28. A medium according to claim 24, wherein the program analysis information generation function

generates a plurality of kinds of program analysis information in turn, and the program analysis information storage function stores the program analysis information in said data recording medium every time each kind of program analysis information is generated.

29. A medium according to claim 24, wherein the program analysis information storage function stores the program analysis information in said data recording medium as a database.

30. A medium according to claim 24, wherein the program analysis information includes at least one of:

- a syntactic analysis tree generated on the basis of source code of the computer program;

- a symbol table indicating meanings of symbols used in source code of the computer program;

- a call graph or flow graph generated on the basis of the syntactic analysis tree;

- data flow information generated on the basis of the syntactic analysis tree, symbol table, flow graph, and call graph; and

- a program dependence graph or module I/O information generated on the basis of the syntactic analysis tree, symbol table, flow graph, call graph, and data flow information.

31. A medium according to claim 30, wherein the program analysis information generation function generates the syntactic analysis tree and symbol table,

call graph and flow graph, data flow information, and program dependence graph and module I/O information in the order listed.

32. A medium according to claim 31, wherein the program analysis information storage function stores each program analysis information in said data recording medium every time the program analysis information generation function generates one of the syntactic analysis tree and symbol table, call graph, flow graph, data flow information, program dependence graph, and module I/O information.

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33. A computer readable storage medium recording a program for making a computer implement a function of generating program analysis information required for analyzing a computer program, hierarchically registering the generated program analysis information in a database in units of analysis objectives, and implementing analysis by reading out the program analysis information already registered in a predetermined layer in correspondence with an analysis objective upon analyzing the computer program.

34. A medium according to claim 33, wherein the database is an object-oriented database.

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